

***CAMELLIA HOAANA* (THEACEAE, SECTION *CORALLINA*), A NEW SPECIES FROM BU GIA MAP NATIONAL PARK IN SOUTHERN VIETNAM**

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Article history

Received: August 17th, 2023

Received in revised form: November 8th, 2023 | Accepted: January 8th, 2024

Available online: February 6th, 2024

Abstract

Camellia hoaana, a new species of the *Camellia* sect. *Corallina* (Theaceae) from Bu Gia Map National Park, Vietnam, is described and illustrated. Morphological features of this species are young branches pubescent and glabrescent. Leaves elliptic to obovate-elliptic; apex bluntly cuspidate, base wide cuneate; above dark green, shiny and glabrous; below paler green and sparsely pubescent along midrib; petiole sparsely pubescent. Flowers solitary or geminate, axillary or terminal; pedicel pubescent. Bracteole 1 (or none), pubescent on both sides, persistent. Sepals 4–5(-6), pubescent on both sides, persistent. Petals 5–6, white, outermost 1–2 pubescent at the apex on both sides, the rest glabrous on both sides. Androecium numerous, 2–3 whorls, glabrous. Ovary 3-locular, white silky tomentose; styles 3, free to the base, glabrous. Capsule subglobose, sparsely pubescent, furfuraceous. Seeds 1–2 per locule, semiglobose or globose, densely brown villous. This new species is assessed as Data Deficient (DD) according to the IUCN categories and criteria.

Keywords: *Camellia hoaana*; New species; Sect. *Corallina*; Theaceae; Vietnam.

DOI: [https://doi.org/10.37569/DalatUniversity.14.1.1207\(2024\)](https://doi.org/10.37569/DalatUniversity.14.1.1207(2024))

Article type: (peer-reviewed) Full-length research article

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1. INTRODUCTION

Southern Vietnam is an area with a high diversity of *Camellia* species, with 40 species distributed in this area, accounting for 40% of Vietnam's camellia species (Chang, 1981; Chang & Ren, 1998; Hoang, Le, & Nguyen, 2022; Hoang, Quach et al., 2022; Le et al., 2020, 2021; Ming, 2000; Ming & Bartholomew, 2007; Nguyen, 2017; Nguyen et al., 2023; Orel & Curry, 2015, 2019; Pham-Hoang, 1999; Quach et al., 2021; Quach, Hoang et al., 2022; Quach, Luong et al., 2022; Sealy, 1958; Truong et al., 2020, 2022). At Bu Gia Map National Park in Binh Phuoc Province, southern Vietnam, two *Camellia* species have been identified: *Camellia bugiamapensis*, with bright yellow flowers (Orel et al., 2014), and *Camellia campanulate*, with pink flowers (Orel & Curry, 2015).

During a floristic survey in Bu Gia Map National Park in 2019 and 2020, a peculiar specimen of *Camellia* was collected. After analyzing and comparing it with morphologically similar *Camellia* species (Chang, 1981; Ming & Bartholomew, 2007; Nguyen, 2017; Orel & Curry, 2015; Pham-Hoang, 1999; Sealy, 1958), we concluded that this species is new to science. This new species, which has white flowers, is named *Camellia hoaana*. It is placed in section *Corallina*.

2. TAXONOMIC TREATMENT

Camellia hoaana H. T. Khuong & S. X. Yang, *sp. nov.* (Figs. 1, 2)

Type:—VIETNAM. Bu Gia Map National Park, Binh Phuoc Province, primary broad-leaved evergreen forest at an elevation of 467 m a.s.l., October 2019, *Khuong Huu Thang, Le Trong Hung, Vuong Duc Hoa* DL191001 (holotype and isotypes, DLU, HN).

Diagnosis: *Camellia hoaana* is most similar to *C. nematodea* (Gagnep.) Sealy (1958), but differs by its ovary tomentose (vs. glabrous), style 1.5–2.5 mm long (vs. 1 mm), and leaves bluntly cuspidate at the apex (vs. bluntly acuminate). It is similar to *Camellia nervosa* (Gagnep.) H. T. Chang (1981), but differs by young branches pubescent (vs. glabrous) and ovary silky tomentose (vs. glabrous). It is similar to *Camellia flosculora* Curry, V. S. Le, C. Q. Truong & V. D. Luong (Le et al., 2021), but differs by sepal pubescent on both sides (vs. glabrous on the face) and style glabrous (vs. pubescent).

Description: Shrub or small tree, 3–7 m tall; young branches brownish, pubescent, and glabrescent. Leaves elliptic to obovate-elliptic, (7.5–)9–11 cm long, 3.5–5(–6) cm wide, coriaceous; apex bluntly cuspidate, base wide cuneate, margins shallowly serrate; above dark green, shiny, and glabrous; below paler green and sparsely pubescent along midrib; midrib and lateral veins sunken above, protruding below; secondary venation 8–10 pairs, pinnate; petiole falcate, slightly curved, pale green, 7–10 mm long, sparsely pubescent. Flowers solitary or geminate, axillary or terminal, 1.4–1.7 cm in diam.; pedicel 1–1.5 mm long, pubescent. Bracteole 1 (or none), close to the calyx, ovate, pubescent on both sides, margins ciliate, persistent. Sepals 4–5(–6), broadly ovate, semiorbicular to suborbicular, 1–3 mm long, 1.2–4.5 mm wide, pubescent on both sides, margins ciliate, persistent. Petals 5–6, white, subrotund to oblong-obovate, 5–8 mm long, 4–5.5 mm wide, outermost 1–2 pubescent at the apex on both sides, the rest glabrous on

both sides, slightly connate at the base. Androecium numerous, 2–3 whorls, 3–4.5 mm long, yellowish, glabrous, outer filaments united for approximately 1 mm from the base, with petals for the same distance, inner filaments free. Ovary 3-locular, ovate, 2.2–2.5 mm long, 3–3.3 mm wide, white silky tomentose; styles 3, 1.5–2.5 mm long, free to the base, glabrous. Capsule subglobose, sparsely pubescent, furfuraceous, 2.6–3.5 cm wide, splitting into 3 valves, pericarp 3–4.5 mm thick when fresh and 2–2.5 mm when dry. Seeds brown, 1–2 per locule, semiglobose or globose, 0.8–1.5 cm wide, densely villous.

Phenology: Flowering from October to December and fruiting from May to July.

Distribution, habitat, and conservation status:

Camellia hoaana is known only from the type locality in 14 subdivisions of Bu Gia Map National Park, with approximately 130 mature individuals located under-canopy in evergreen broadleaf and semi-deciduous forest at elevations of 400 to 700 m. Juvenile plants or seedlings are very rare. *C. hoaana* grows with species *Dipterocarpus alatus*, *Hopea odorata*, *Dalbergia mammosa*, *Swintonia floribunda*, *Lagerstroemia* sp., *Azelia xylocarpa*, *Pterocarpus macrocarpus*, and *Cratoxylum* sp. The data are inadequate for risk assessment. *Camellia hoaana* can be assessed as Data Deficient (DD) according to the IUCN Red List 2019 criteria (IUCN, 2019).

Etymology: The specific epithet of this species honors Dr. Vuong Duc Hoa, director of Bu Gia Map National Park, who has made many contributions to camellia conservation in the park.

Vernacular name: Trà hòà.

Additional specimens examined:—VIETNAM. Binh Phuoc Province, elevation 700 m a.s.l., July 2020, *Khuong Huu Thang, Le Trong Hung* DL200403 (paratype DLU).

Note: Based on the characteristics of flower very small with short pedicel, bracteole 1 or missing and contiguous to the calyx, bracteole and sepal persistent, inner petals slightly united at the base, stamen very short and free above the union with the petals, style free and very short, *Camellia hoaana* should be a member of sect. *Corallina* (sensu Ming & Bartholomew, 2007, including sect. *Brachyandra*). In this section, there are approximately nine species worldwide (Ming, 2000; Ming & Bartholomew, 2007), of which only two, *C. nematodea* and *C. nervosa*, are distributed in southern Vietnam. Hoang, Quach et al. (2022) moved sympatric *C. flosculora* into this section. A morphological comparison of the four species of sect. *Corallina* in southern Vietnam is presented in Table 1. In general, *C. hoaana* is closest to *C. nematodea*.

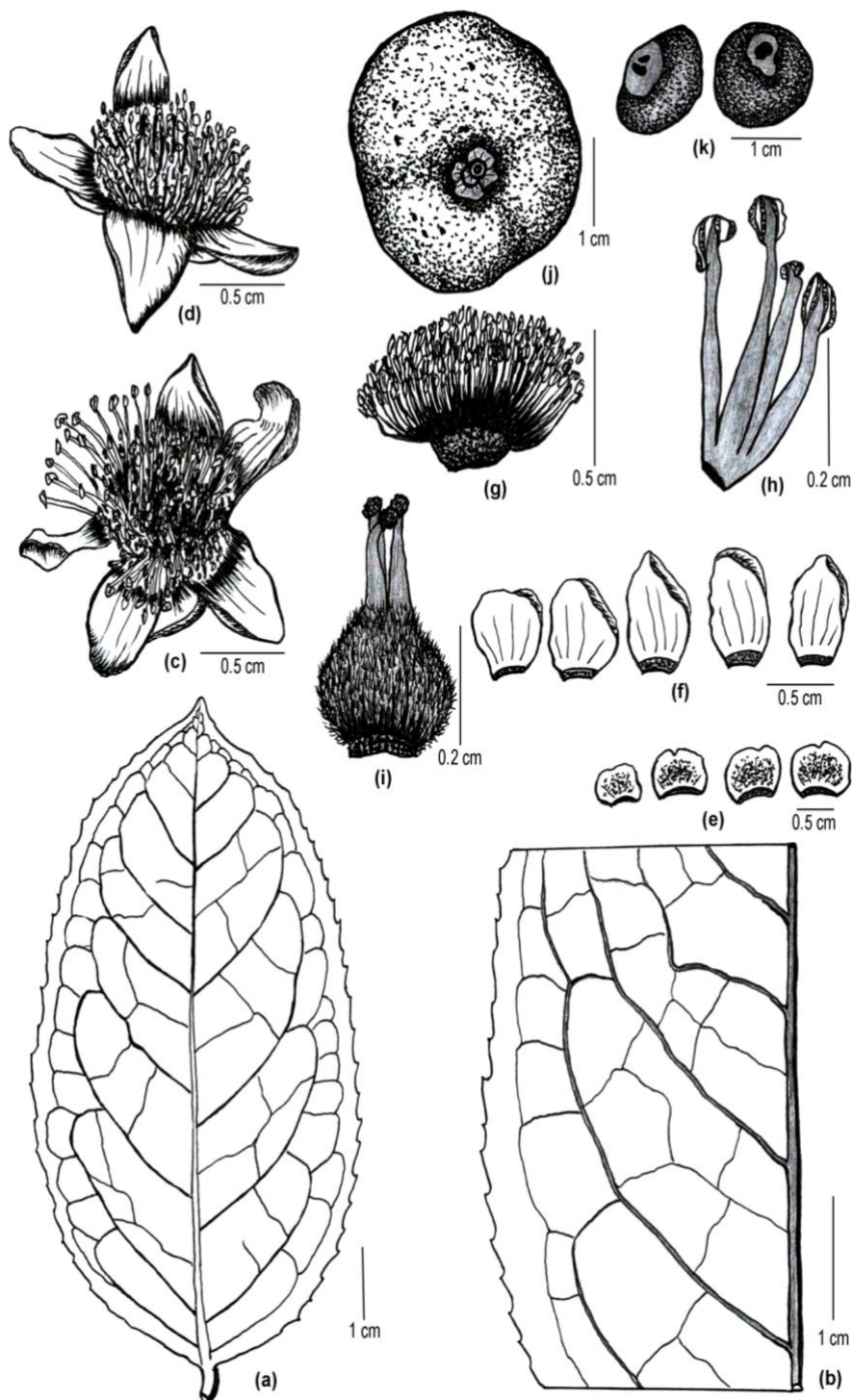


Figure 1. *Camellia hoaana*

Note: (a) Adaxial leaf; (b) Details of abaxial surface (partial); (c, d) Flower; (e) Sepals; (f) Petals; (g) Androecium; (h) Stamens; (i) Gynoecium; (j) Fruit; (k) Seeds.

Source: Drawn by Luong Van Dung.

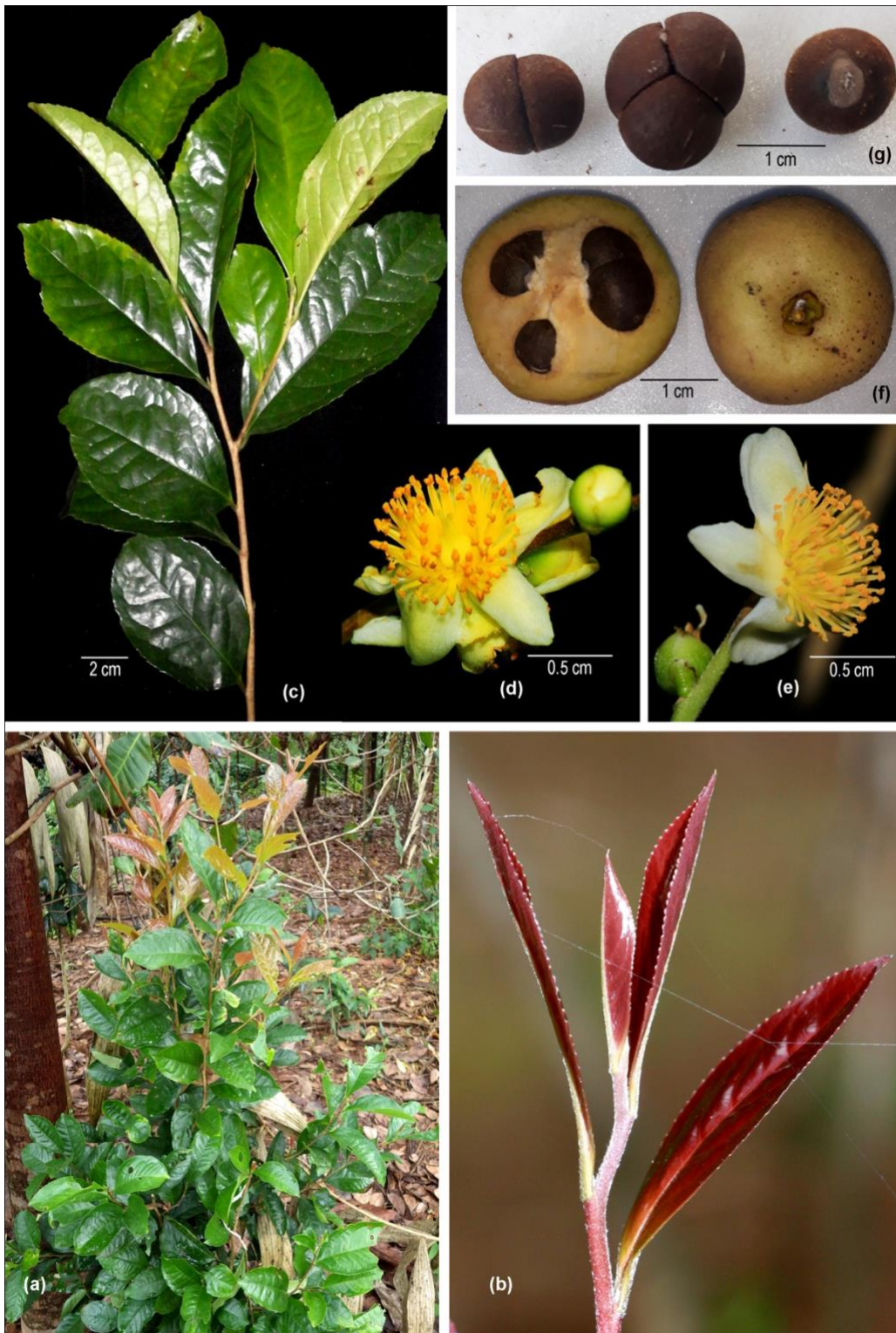


Figure 2. *Camellia hoaana*

Note: (a) Habit; (b) Bud and young leaves; (c) Branch with leaves; (d, e) Flower; (f) Fruit (cross-section, left); (g) Seeds.

Source: Photos by Khuong Huu Thang.

Table 1. Morphological comparison of the species of *Camellia* sect. *Corallina* in southern Vietnam

| Character | <i>C. nervosa</i> (Chang, 1981) | <i>C. flosculora</i> (Le et al., 2021) | <i>C. nematodea</i> (Sealy, 1958) | <i>C. hoaana</i> |
|----------------------|---|--|---|--|
| Young branches | glabrous | pubescent | pubescent | pubescent |
| Leaf blade shape | elliptic to oblong-elliptic | lanceolate to oblong-ovate | elliptic | elliptic to obovate-elliptic |
| Leaf size | 6–8 × 2.5–3.3 cm | 3–7 × 1.5–2.5 cm | 4.5–6.5 × 2.3–3.2 cm | (7.5–)9–11 × 3.5–5(–6) cm |
| Leaf apex | bluntly acuminate | acuminate or narrowly acuminate | bluntly acuminate | bluntly cuspidate |
| Leaf base | cuneate | nearly rounded or broadly obtuse | cuneate | wide cuneate |
| Leaf abaxial surface | glabrous | pubescent along midrib | sparsely pubescent along midrib | sparsely pubescent along midrib |
| Petiole | 7–10 mm long, glabrous | 4–5 mm long, pubescent | 5–7 mm long, sparsely pubescent | 7–10 mm long, sparsely pubescent |
| Flower size | approx. 1.5 cm | 0.5–0.7 cm | 1.5–1.8 cm | 1.4–1.7 cm |
| Pedicel | 1 mm long, stout cushion-like, glabrous | 3–4 mm long, pubescent | 2–3 mm long, sparsely pubescent | 1.5 mm long, pubescent |
| Bracteole | 2, close to the calyx, glabrous on the back and pubescent on the face | 1 or 0, close to the calyx, pubescent on the back and glabrous on the face | 1 or 0, close to the calyx or scattered, sparsely pubescent on both sides | 1 or 0, close to the calyx, pubescent on both sides |
| Sepal | glabrous on the back and pubescent on the face | pubescent on the back and glabrous on the face | sparsely pubescent on the back and densely pubescent on the face | pubescent on both sides |
| Petal | 5, white (?), glabrous on the back and pubescent at the apex on the face | 5–(6), white, glabrous | 5, white, outermost 1–2 sparsely pubescent on both sides, the rest glabrous | 5–6, white, outermost 1–2 pubescent at the apex on both sides, the rest glabrous |
| Filament | 3.5 mm long, glabrous, stout, subulate, outer filaments united for 0.5 mm from the base | 2–3 mm long, glabrous, outer filaments united for 0.5 mm from the base | 5 mm long, glabrous, outer filaments united for 1–2 mm from the base | 3–4.5 mm long, glabrous, outer filaments united for approx. 1 mm from the base |
| Ovary | glabrous | densely tomentose | glabrous | white silky tomentose |
| Style | glabrous, 1.5 mm long | pubescent, 1.5–1.7 mm long | glabrous, 1 mm long | glabrous, 1.5–2.5 mm long |
| Capsule | ovoid, obtuse on top, pericarp 2–3(–5) mm thick when dry | subglobose, obtuse on top, pericarp 1 mm thick when dry | - | subglobose, flattened on top, pericarp furfuraceous, 2–2.5 mm thick when dry |
| Seed | - | glabrous | - | brown, densely villous |

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